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Hurley's Transcendental Enactivism

Abstract: Susan Hurley (1998a, 2003a, 2008) argues that our capacities for perception, agency and thought are essentially interdependent and co-emerge from a tangle of sensorimotor processes that are both cause and effect of the web of interactive and communicative practices they weave us into. In this paper, I reconstruct this view and its main motivations, with a particular focus on three important aspects. First, Hurley argues that an essential aspect of conscious perception – its perspectival unity – constitutively depends on agency. That is, agency is a *transcendental condition* on the possibility of perception (§3). Second, understanding why this dependence obtains involves understanding why perception and agency emerge together, and how they do so on the basis of a web of interrelated capacities for sensorimotor control (§2, §4). Third, understanding these first two aspects of Hurley's view is the key to understanding the sophisticated interplay between i) her arguments for the causal interdependence of sensory input and motor output, and ii) her arguments for the essential interdependence of perception and agency.

Keywords: Sensorimotor Theory; Enactivism; Unity of Consciousness; Shared Circuits Model

1. Hurley's View

In her groundbreaking *Consciousness in Action* (henceforth CA) Susan Hurley (1998a) articulated and motivated a *2-level interdependence view* of the relationship between perception and agency. The two levels here are the personal level – the level at which we speak of persons, their capacities, and the states that they are in – and the subpersonal level – the level at which we speak of the processes that figure in enabling explanations of phenomena at the personal level. There is, Hurley argues, interdependence at both these levels – dynamic interdependence of inputs and outputs at the subpersonal level, and constitutive interdependence of perception and agency at the personal level. Henceforth I'll simply call the conjunction of these claims about interdependence 'Hurley's View'.

To say that perception and agency are *constitutively* interdependent is to say that one could not exist without the other – not as a matter of contingent empirical fact, or in virtue of the causal links that bind them, but in virtue of what each capacity essentially is. Perception couldn't be what it is without agency, and vice versa; agency and perception are, by their very nature, two sides of a single coin. For Hurley, as we will see below, this is because possessing the capacity to act is a *transcendental condition* on possession of the capacity to perceive – and vice

versa: being a perceiver is a *transcendental requirement* for being an agent. Hence, Hurley's View has a transcendental component to it. That is, it's no quirk of fate that all perceivers have the capacity for agency – when we think things through properly, we'll see that the notion of a perceiver without that capacity simply *doesn't make sense*. Our goal in this paper is to understand Hurley's motivations for this claim.

This is the task, taken up below, of understanding the *transcendental* aspect of Hurley's View. But why classify the view as a kind of *enactivism*, especially since Hurley never applied that term to her own view in print? It's certainly true that neither the preoccupation with the biological roots of cognition (e.g. Varela, Thompson and Rosch 1991), nor the hostility to appeals to representation in cognitive scientific explanation (e.g. Hutto and Myin 2012) that characterize much 'enactivist' theorizing, are evident in Hurley's work. However, the canonical formulation of enactivism by Varela, Thompson and Rosch (1991) stipulates that:

'In a nutshell, the enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided.' (p.173)

As we'll see below, Hurley's View provides reasons for endorsing a softened version of (1), whereby perception *essentially depends* on a *capacity for* perceptually guided intentional action, and provides a way of spelling out (2) by specifying how the specific 'cognitive structures' of world-disclosing perception, world-directed action, and world-sensitive deliberation can arise from a particular sensorimotor control structure. Hurley's View thus displays perception, agency and deliberation as essentially interrelated aspects of a single cognitive package, dependent on sensorimotor activity.¹

2. Input and Output

How might we argue for these striking claims? Here's one suggestion, inspired by Hurley's work: we might argue that 'contentful intentions and experience both depend on relations between causal input and causal output, so that agency and experience are constitutively interdependent' (p.85).² We might argue for the first part of this

¹ Her view thus belongs to the same general family as the 'sensorimotor' enactivist views of O'Regan and Noe (2001) and O'Regan (2011). See Dagenaar and O'Regan (forthcoming) for more on the relationship between sensorimotor accounts of perception and the views mentioned above.

² How does my characterizing Hurley's View as an 'enactivist' position square with this talk of *content*, and the references to what perceptual states *represent* that appear in places below? After all, enactivists (e.g. Varela,

claim (that intentions and experience both depend on relations between input and output) by marshaling a battery of cases where tinkering with input/output relations affects intentions, experience or both, or where the normalization of intention or experience depends on restoring a pattern in input/output relations. Hence, chapter 9 of CA provides a series of rigorous and nuanced discussions of empirical cases in the service of a 2-pronged strategy: to show that i) there are cases where the *same* inputs or outputs can give rise to *different* perceptions and intentions, and that ii) there are cases where *different* inputs or outputs can give rise to the *same* perceptions and intentions. Thinking through each of the cases suggests that the sameness or difference of perceptions and intentions can be best explained through appealing to sameness or difference in the causal dynamics characterizing the relationship between input and output.

To this end, Hurley firstly presents a series of cases where the same sensory input is associated with different perceptual experiences, and suggests explanations of each of these in terms of *differences in input/output relations*. For example, she appeals to Gallistel's (2013) suggestion that efference copy explains perceived movement in a subject with a paralyzed eye, to the recovery of perceptual abilities in tactile-visual sensory substitution systems through replicating structural similarities in patterns of sensory input and motor output (Bach-y-Rita 1983, Ward and Meijer 2010), and provides sophisticated analyses of phenomena observed in output neglect and commisurotomy experiments, and to the after-effects of visual adaptation to distorting goggles.

As a corollary to this batch of cases, she also lists cases where the same motor output is associated with different exercises of intentional agency, and likewise suggests that differences in the relations between inputs and outputs can explain these. For example, she argues that the motor outputs of the deafferented subject Ian Waterman (as recounted in Cole (1995)) regain their status as episodes of intentional agency when their relationship to visual input becomes functionally isomorphic to their relationship to proprioceptive input prior to his deafferentation. She considers evidence (see e.g. Harris (1980), Klein (2008), Ward (2012, forthcoming)) that adaptation to goggles that flip or distort the visual field might consist in proprioceptive and intentional adaptation, and thus how identical movements might come to embody different intentions due to their

Thompson and Rosch 1991, Hutto and Myin 2012) are traditionally hostile to appeals to representation in cognitive science. A full treatment of this important issue is beyond the scope of this paper. But the quick answer is that nothing in Hurley's View, as I present it here, commits it to attributing representational states or content to states or events at the *subpersonal* level – the level of processes that figure in enabling explanations of phenomena at the personal level. And it is primarily to such attributions that enactivists object. No enactivists deny that some aspects of our mental life are appropriately characterized in terms that involve representation and contentful states. Hurley's View, as I present it in this paper, suggests an account of the conditions a sensorimotor system must fulfill in order for such characterizations to be appropriate.

differing relationship to visual and proprioceptive inputs. And she reflects on how new basic intentions might be acquired through learning new relationships between perceptual input and motor output.

Next, the range of cases where *different* inputs and outputs are associated with the *same* perceptions and actions. In the perceptual case we can again appeal to adaptation to inverting or distorting goggles, noting the professed similarity between perceptual experience pre- and post-adaptation despite the difference in sensory input induced by the goggles. Similarly, we can appeal to the professed *visual* character of the experiences of some users of sensory-substitution devices (e.g. Ward and Meijer, op cit.). And in each case we can explain the visual invariance in the face of changing input by appealing to invariance at the appropriate level of description in the causal dynamics of input/output relations. Finally, Hurley considers how the same intention might be associated with different motor outputs – for example an intentional action with the indexical content ‘reach for *that* point in my peripersonal space’ performed by a subject whose intentions and proprioception have adapted to distorting goggles is realized by different motor outputs pre- and post-adaptation.³

Understanding perception and agency as mutually dependent on a shared set of looping causal dynamics obtaining between input and output thus affords elegant and unified explanations of a range of cases that otherwise appear quite puzzling. And Hurley goes on to argue (chapter 10) that such an understanding might be further motivated by endorsing both a *motor theory of perception*, where perception depends on the relationship between changes in sensory input caused by perceiver’s movement, changes in sensory input not so caused, and efference copy (motor commands used to predict sensory feedback), and a *control systems theory of action*, where action consists in the control of perception. Hurley’s suggested combination of these frameworks adds up to a striking anticipation of an important strand of current work on predictive processing models of perception and action, where the active suppression of unanticipated sensory consequences through movement is a key part of perceptual processing, and where motor control is a matter of generating anticipated sensory states.⁴

³ Some readers might perceive a problem in the double-duty appeal to distorting goggles does in this part of Hurley’s account – usually *either* perceptual *or* intentional adaptation are appealed to in accounting for the results of the goggle cases, with these thought to be mutually exclusive alternatives. However, Ward (forthcoming) argues that this dichotomy is misguided, and that due attention to reports of adaptation suggests that both forms of adaptation occur simultaneously – as Hurley’s view would predict.

⁴ E.g. according to Clark’s (2015) treatment, ‘[Predictive processing] makes a strong proposal concerning the cognitive centrality of a complex looping interplay between perception and action. In fact, so complex, central and looping is the interplay that perception will emerge... as inseparable from action, and the theoretical divisions between sensory and motor processing will themselves be called into question.’ (p.65)

This line of thought – using analyses of problem cases to motivate a framework according to which perception depends on sensorimotor dynamics – has become perhaps the most influential aspect of Hurley’s pioneering enactivist work (see e.g. Noë and O’Regan 2001; Hurley and Noë 2003; Noë 2004, 2009, O’Regan 2011). However, it is only one aspect of Hurley’s View, and importantly is not an aspect that straightforwardly affords an inference to the claim of the *essential* interdependence that concerns us here.⁵ Hurley spends the first chapter of CA uncovering and warning against confusions that result from hastily projecting properties of the causal structures that enable mental phenomena (such as the dynamic interdependence of inputs and outputs) onto properties of the phenomena themselves (such as the essential interdependence of perception and action). Because of this – and because, as we will see shortly, a large part of CA is devoted to outlining precisely the kinds of arguments that *can* demonstrate essential interdependence – we must assume that the hard work of motivating the personal level constitutive interdependence endorsed by Hurley is largely done elsewhere.

If we cannot straightforwardly infer the essential interdependence of perception and agency from the considerations we have just sketched, why bring them up? There are several reasons. The arguments sketched above deserve to be better known – whilst appeal to sensory substitution and visual adaptation have become commonplace when motivating sensorimotor or enactive views, Hurley’s equally important discussions of neglect, commisurotomy and deafferentation deserve more attention. The painstaking taxonomy of cases into sensory and motor variations and constancies also provides extra explanatory punch that analogous empirical motivations of a sensorimotor view often lack. And, as mentioned above, the interdependence of sensory and motor processes Hurley argues for meshes nicely with influential current work on predictive processing approaches to cognition (e.g. Hohwy 2013, Clark 2015, Seth 2015). So part of my motive is a hope to pique the interest of some readers in further explorations of these arguments, and those of similar form. A second reason is that attending to this aspect of Hurley’s View is the easiest way to make one of its most distinctive aspects clear: it is sensorimotor *interdependence* that is at issue here, rather than a 1-way dependence of perception on agency. Sensorimotor views have, for the most part, been interested only in this latter direction of dependence, focusing on the importance of grasping or predicting how motor activity bears on sensory input. By contrast, we saw above that every claim Hurley makes about sensory input has a parallel for motor output. Lastly, and most importantly, a rich and delicate interplay between empirical and conceptual, enabling and constitutive considerations is a distinctive feature of Hurley’s work, and to focus on one of these aspects in isolation from

⁵ Despite some passages – such as the quote from CA p.85 above – where Hurley appears to suggest otherwise. By §5 we will be in a position to see why Hurley is not making the straightforward projection from properties of vehicles to contents that the passage appears to suggest.

the other would be to distort her methodology. In fact, as we will be in a position to see by our final section, Hurley *does* think that the constitutive interdependence of perception and agency crucially depends on the looping causal dynamics just sketched – but this conclusion is not motivated by a straightforward inference from the dynamic interdependence of input and output to the constitutive interdependence of perception and action. Understanding just how these aspects of Hurley’s View are related is, we shall see, a complex endeavor – but one that gets us to the heart of what is original and important about her enactivism.

3. Agency and Perspectival Unity

3.1 A Kantian Argument

If Hurley’s views on dynamic causal interdependence aren’t the main motivation for her claims about the essential interdependence of perception and agency, what else might be doing the job? In the first part of CA Hurley explores the possibility that agency is a transcendental condition for the possession of a unified conscious perspective upon the world, and does so partly through considering an argument from Kant. Plausibly, having a unified perspective on the world is an essential property of conscious perceivers.⁶ In an influential passage from the ‘transcendental deduction’ in the *Critique of Pure Reason*, Kant suggests the following explanation for the unity of a subject’s point of view on the world:

‘It must be possible for the ‘I think’ to accompany all my representations; for otherwise something would be represented in me which could not be thought at all, and that is equivalent to saying that the representation would be impossible, or at least would be nothing to me.’ (B131 – B132)

Many gallons of ink have been spilled in the service of understanding the argument of which this claim forms a part and, following Hurley’s lead (CA p.56), we should distance ourselves from the project of providing a ‘correct’ interpretation of Kant’s views here. Nonetheless, we can use the claim above, and the ways in which some interpreters have located it within the wider framework of Kant’s thought, as a starting point. The basic idea is simple. What makes it the case that a particular perception (for example) is *mine*, rather than someone else’s? Kant’s suggestion is that a perception (or any state relating a subject to an object) can only intelligibly

⁶ This is not to say that the world cannot present itself to us as fragmented or disjointed. But to be elements of one conscious perception rather than two those fragments must be encompassed within a single perspective – if this were not the case then it seems we should say that not all of the fragments are consciously experienced, or that there is more than one seat of perceptual consciousness, with some fragments belonging to one, some to another.

count as *mine* when I have the capacity to focus on it in thought. Note that I needn't be *exercising* this capacity for a representation to form part of my unified perspective on the world – it suffices that my relation to the representation is such that I *could* think about it or its content. My experiences are thus mine, and yours are not, because they are available for me to focus on in thought in a way that yours are not. A perceptual state which is not available as food for thought to anyone in this way 'would be nothing to me', or to anyone else. There might still be good reasons to count such a state as perceptual – but the Kantian point is that in being unavailable to thought it could not intelligibly figure in the unified perspective on the world that is characteristic of *conscious* perception.

Importantly, I can stand in the appropriate relation to the states that make up my perspective on the world in virtue of something I can *do* with or to them – think about them. If this is right, then it appears that an essential property of my conscious perception of the world – its unity – depends for its very intelligibility on my capacity as an agent to direct my thought this way or that. So we have an outline of a transcendental argument that perception essentially depends on agency. Following Taylor (1978) we can understand transcendental arguments as those

'that start from some feature of our experience which they claim to be indubitable or beyond cavil. They then move to a stronger conclusion, one concerning the subject or [its] position in the world. They make this move by a regressive argument, to the effect that the stronger conclusion must be so if the indubitable fact about experience is to be possible (and, being so, it must be possible).' (p.151)

In this case, the indubitable feature of experience is its perspectival unity, the regressive argument consists in the claim that such unity is unintelligible independently of the capacity to direct thought towards each constituent aspect of the unity, and the stronger conclusion is thus that conscious perceivers are necessarily agents.

Things get murkier when we try to think through the precise character of the activity upon which, according to Kant, unity depends. In brief and contentious outline, the crucial active capacity for Kant is *synthesis* – pulling together the aspects of one's sensory openness to the world through the application of concepts. The aim of the transcendental deduction as a whole is to show that the capacity to judge and the objectivity of thought and experience also depend on the capacity for synthesis. Thankfully we don't need to venture into these tricky exegetical waters. Our focus here is on Hurley rather than Kant; and Hurley has a simpler suggestion as to the

role of agency in unified experience. But before we consider it, we must work through some problems Hurley sees for the Kantian strategy.

3.2 *Just More Content, The Myth of the Giving, and Objective Accounts of Unity*

Hurley retains the Kantian thought that the unity of experience – and thus a crucial aspect of consciousness itself – depends on agency, but rejects the idea that the relevant agentive capacity consists in synthesizing or conceptualizing for two reasons. The first is that the requirements it places on possession of a unified perspective look too demanding. Intuitively, we want to credit many non-human animals with unified conscious perspectives on the world. But the capacities for concept use and discursive judgment that are bound up with Kant's conception of the synthesizing activity required for unity might be distinctively human – at any rate, they don't look co-extensive with our intuitive conception of the kinds of creatures that might be conscious. The second is that Kant's suggestion, as spelled out so far, looks vulnerable to what Hurley dubs the *just more content* argument (CA pp.60–66). Consider the following doomed attempt to account for the unification of two states, one with the content 'this object is a pencil', one with the content 'this object is red', in a single conscious perspective. Perhaps we can explain their unification by appeal to a third contentful state, with the content 'the state about the pencil and the state about the object belong to the same perspective.' But this won't work; if we think there's a problem about unity in the first place then the problem arises with just as much force when asking how this new group of three states are unified – the fact that the content of one of these states pertains to unity doesn't help us. The third state provides *just more content* needing unified. To see this is to see that questions about the unity of contentful states can't be answered via appeal to some special or privileged states whose contents pertain to unity. But, on one reading, this is just what the Kantian suggestion of the previous section appears to suggest. If we admit that adding unity-representing contentful states to the pile of states requiring unification doesn't help us, then why should appealing to contentful *activity* fare any better? If we add to 'this object is red' and 'this object is a pencil' an activity, or intention, or disposition with content such as 'I'm synthesizing!', 'I could synthesize right now!', or 'I hereby synthesize the content of these two states into a unity!' this too appears to add just more content whose unification within one perspective requires explanation. The fact that we have added the content of an activity or disposition, rather than the content of a perception or belief, doesn't make the problem go away – at least we've been given no reason to think it does.

Why is this problem easy to miss? Hurley suggests (p.15, p.76, pp.240–243) that philosophers are vulnerable to the *Myth of the Giving* – the tendency to forget that the ways in which our activities and intentions get their content stands in need of explanation (and to forget this even whilst pursuing parallel questions of how our

perceptual states acquire their content), and to assume that our activity is unproblematically contentful ‘pure output’ from mind to world.⁷ Hence we should not assume that ‘by appealing to *what we do* we somehow get beneath problems of unity and content-determination’ (p.242). Once we see this, it appears clear that what Hurley calls a merely *subjective* account of the unity of experience – that is, an account in terms of the contents of the states whose unity requires explanation – won’t do. So however we develop the Kantian insight that a unified perspective on the world depends on our activity (or the possibility of our activity), our account should include an *objective* component. Hurley has two suggestions about what this component might be, and suggests (p.215) that these might be individually necessary and jointly sufficient for unity. The first is that the unified states should causally depend on a shared dynamic singularity, of the kind we get from conjoining motor theories of perception with control theories of action in the way sketched in section 2 above. Given, as we noted above, that Hurley begins CA with an extended warning against straightforwardly projecting properties from subpersonal to personal levels (and vice versa), it’s natural to wonder how dynamic unity at the subpersonal level is supposed to imply perspectival unity at the personal level. We will be in a position to say more about this in a couple of section’s time. Doing so will involve understanding Hurley’s second suggested objective component of unity – the *normative coherence* of the states that are unified within a single perspective. To see why coherence might matter for a unified perspective, consider cases where we might think that sensory states within a single subject are not unified for a single conscious perspective. Hurley describes a hypothetical commisurotomy patient, whose left half-brain controls his right hand responses, and whose right half-brain controls his left hand responses, placed in the following laboratory set up:

‘...the experimenter arranges for there to be a single point of red light in the patient’s right field and a single point of green light in the patient’s left field. Suppose, when asked what he sees while fixating, the patient indicates using his right hand that he sees just one point of light, which is wholly red, and simultaneously indicates, using his left hand that he sees just one point of light which is wholly green. There is a normative incoherence here: it does not make sense for there to be an experience as of just one point of light, which is at one time both wholly red and wholly green. We cannot attribute such incoherent contents to one consciousness. Therefore, we segregate them, or recognize disunity.’ (p.114)

⁷ A large part of Ch.2 of CA is devoted to uncovering this tendency in interpretative work on Kant, while Ch.6 considers the tendency as it arises in work on Wittgenstein’s (1973) appeals to practice or forms of life. Note that in neither case is Hurley accusing Kant or Wittgenstein of succumbing to the myth of the Given themselves.

Here the attribution of disunity depends on the normative relationship between the disunified contents – the contents ‘I perceive only a red light’ and ‘I perceive only a green light’ are inconsistent, and it is this inconsistency that prevents us from attributing them to a single conscious perspective in the commisurotomy case. Similarly, in cases of multiple personality or dissociative identity disorder (pp.121-2) too much incoherence between the perceptions, plans and projects housed within one body encourages us to attribute multiple conflicting perspectives on the world to a single human. These examples, however, only motivate the idea that there is some intuitive connection between perspectival unity and normative coherence. For a deeper understanding of their relationship according to Hurley’s View, we need to return to her way of developing the Kantian insight – that the unity of perceptual consciousness constitutively depends on my capacities as an agent.

3.3 Perspectival Self-Consciousness and Intentional Access

Remember Hurley’s first problem with the Kantian view considered above – it looks demanding enough to rule out many creatures we intuitively wish to count as possessing a unified conscious perspective on the world. So Hurley wants to explore the possibility that ‘we can begin to motivate [Hurley’s View] by focusing on ordinary motor actions, rather than fancy actions like synthesizing, classifying and conceptualizing’ (p.86). To do so, we can join other sensorimotor theorists (e.g. O’Regan and Noë 2001, Noë 2004) in stressing that, simply in virtue of the kind of embodied creatures we are, there are systematic causal interrelations between sensory input and motor output. And, leaving aside for the moment the question of how to bridge the two levels of description, in our human case and any other where it is appropriate to speak of a ‘personal’ or ‘animal’ level, there are systematic interrelations between perception and action. These interrelations, and a practical grasp of them, can be put to work in explaining what’s required for a unified perspective on the world:

‘Having a perspective means in part that what you experience and perceive depends systematically on what you do, as well as vice versa. Moreover, it involves keeping track, even if not in conceptual terms, of the ways in which what you experience and perceive depends on what you do. In this sense, having a perspective involves self-consciousness.

Agency is essential to perspectival self-consciousness. But the kind of agency that is essential is intentional motor agency of an ordinary, empirical, worldly, embodied kind – as opposed to acts of classifying or conceptualizing or judging.’ (CA p.140)

The kind of capacity for intentional motor agency Hurley is alluding to in the second part of this quote is what she calls *intentional access* – the capacity to use the content of a perception as part of the content of an intention. I exercise this capacity when I form an intention like ‘I will eat *the cake that is on the table*’ – the italicized part is the content of a perceptual state that has been put to use in forming an intention.⁸

In CA (pp. 146-9) Hurley illustrates this requirement with respect to blindsight and similar cases. Blindsight subjects can, in forced-choice conditions, make reliable discriminations based on a perceptual sensitivity to their situation which doesn’t figure in their conscious perception of their surroundings – for example, discriminating between shapes, or hues, or facial expressions, despite reporting that no conscious visual experience guides their guessing. It appears that they, or their visual systems, are undergoing perceptual states that reliably represent properties of their surroundings, but that the contents of those states are not integrated into a unified conscious perception. Hurley’s suggestion is that this lack of integration consists in the subjects’ lacking abilities to put the contents of those states to use in their intentional activity – for example they must be prompted by experimenters as to when to make their discriminations, in contrast to normal subjects whose perceptual sensitivity meshes with their practical activity with no need for external support.⁹

Where Kant invoked the capacity for synthesis as a transcendental condition on the unity of consciousness, Hurley invokes this simpler capacity for intentional access. The basic rationale behind each move is the same – in section 3.1 above, I spoke of the unintelligibility of a representation’s counting as *mine* unless I could ‘focus on it in thought’ – if I don’t stand in this relation to it then it seems that it ‘would be nothing to me’. On Hurley’s View, this ‘capacity to focus on a representation in thought’ is understood as the capacity to use its content in forming intentions. Without being able to *do something* with or to the content of a representation in this way, the suggestion goes, it is unintelligible how it could form part of my unified perspective on the world.

⁸ Correlatively (though this aspect of the view is implied but not explored in CA) the content of an intention should be able to function as the content of a perception – as in ‘I can see the cake *I’m going to eat*’. For a recent defense of the thesis that the contents of perception can include the contents of intentions, see Siegel (2014). It is a consequence of the account developed in the next two sections that the truth of Hurley’s View would entail that contents of affordances figure in the contents of perceptual experiences.

⁹ For further discussion of the relationship between conscious experience and the capacity to put sensory information to use in intentional activity, see Ward, Clark and Roberts (2011). From the perspective of Hurley’s View the ‘Action-Space’ account of perceptual experience defended in that paper only tells part of the story about the relationship between perception and agency: it correctly identifies that perception depends on a grasp of afforded actions, but courts the Myth of the Giving by failing to give a corollary account of the content of perceived affordances, and of how that content is ‘grasped’.

Therefore, on Hurley's view, the capacity for intentional access is a transcendental condition on the unity of consciousness.¹⁰

At this point, a couple of questions appear pressing. First, how does this proposed account of perspectival unity fit with the requirement introduced in the last section – that a satisfactory account of the perspectival unity of consciousness should have an objective component? Second, in appealing to agency in order to explain the unity of perceptual consciousness, hasn't Hurley committed the Myth of the Giving – one of the cardinal sins against which CA is supposed to be ridding us? At this point, the lines of argument in CA become less clear. Hurley describes CA as 'groundwork' for a two-level interdependence account of unity, and denies that she is attempting a 'full-dress development' of such a view (p.218). However, I think that a coherent line of thought about these questions is suggested in CA, and the materials to develop this line further are suggested in Hurley's later work on animal and social cognition (e.g. Hurley 2003, 2008). It is by viewing this later work in the context of the ideas we have been exploring above, I will now suggest, that the full explanatory scope of Hurley's enactivism can be brought into view.

4. From Sensorimotor Systems to Practical Reasoners

Hurley's proposed account of the perspectival unity of consciousness is not a 'subjective' account of unity, in that it does not aim to account for unity in terms of some privileged content of a state or activity. Instead, it

¹⁰ Must we interpret Hurley's thinking on this score as involving a transcendental component? An anonymous reviewer suggests that we can retain much of the argumentative force of Hurley's View, and all of its empirical support, while interpreting it as providing an *abductive* argument for the essential dependence of unified perceptual experience on agency. That is, instead of arguing that unified perceptual experience is *only intelligible* against the backdrop of a capacity for intentional access, we might interpret Hurley as arguing that unified perceptual experience is *best explained by* appeal to such a capacity. The reviewer rightly notes that Hurley never describes her own thinking in this way, and that worries about the validity of transcendental arguments might make an abductive interpretation more appealing to some. As a matter of Hurley exegesis, the fact that she presents her argument about intentional access as an improved version of Kant's proposal about the transcendental role of spontaneous synthesis seems to slightly favour the transcendental interpretation over the abductive – and while Hurley never explicitly describes herself as advancing a transcendental argument in this connection, nor does she explicitly describe herself as advancing an abductive one. More importantly, I think the abductive interpretation fails to do justice to the strength of Hurley's argument – as I perceive the force of the argument, the capacity for intentional access to contents does not merely constitute one possibility among several for a necessary condition upon the unity of perceptual experience. Rather, if we find Hurley's Kantian argument convincing, having a unified perceptual experience is simply *unintelligible* unless the content of that experience can inform the intentional activity of a single agent. Nonetheless, the reviewer is right to note that someone who found an abductive, but not a transcendental, version of this argument convincing could equally well endorse the rest of Hurley's View and the empirical support she marshals for it.

appeals to a property of the ways in which the mental states of a subject are interrelated – the way in which the content of one state (in the above example, the content of a perception) can be used to form the content of another (above, an intention). Thus Hurley’s proposed account does not appear vulnerable to a ‘just more content’ objection of the kind we considered above.¹¹ It does, however, appear to appeal to agency in order to demystify a property of perception without considering parallel mysteries that might arise for agency. Does it, then, commit the Myth of the Giving? Gathering the materials for what I think must be Hurley’s answer to this question will take a little time – but our reward will be a unified vision of Hurley’s philosophy of mind. First we must consider what, for Hurley, makes it distinctively appropriate to speak of the presence of personal level states such as intentions and perceptions at all.

4.1 Holism and Normativity

Following Davidson (1980) and others (e.g. Dennett 1989, McDowell 1998) Hurley holds that meeting certain constraints of *holism* and *normativity* is both necessary and sufficient for the existence of a personal level. This is tricky philosophical territory, but a basic grip of these ideas is enough for our purposes here. The background issue is something like this: in explaining the activity of some systems – clockwork toys, vending machines, photocopiers – a mechanistic or physical analysis of their workings tells us everything we need to know about them. But for other systems – humans and at least some animals – we can *also* explain their activity in a way that ignores mechanical details and appeals to mental states such as *motives* and *perceptions*. When I ask why the pig went into the shed I am more likely to be looking for an explanation such as ‘it *saw* the apple and *wanted* to eat it’ than for an explanation in terms of porcine biomechanics, neurophysiology and the physical state of its surroundings. How should we understand the difference between these two forms of explanation? That is, what are the criteria that distinguish explanations in terms of mental states from merely mechanistic ones? The Davidsonian answer Hurley endorses (CA p.5, p.137, Hurley 2003) is that explanation in terms of mental states proceeds holistically and is normatively constrained in a way that mechanical explanation is not. *Holism* says roughly that, just as a meaningful word or phrase can only exist in the context of a language, a meaningful perception or intention can only exist in the context of a web of interrelated mental states. Truly understanding the word ‘pig’ requires understanding how the word fits in to a web of communicative practices; truly possessing the belief ‘there’s a pig’ requires, on the conception Hurley is working with, the capacity to have mental states about contrasting objects that are *not* pigs, about locations other than the one picked out by ‘there’, and with

¹¹ We might think that for the same reason Kant’s original account is not vulnerable to such an objection. What does explanatory work for Kant does not appear to be the content of the activity of synthesis, but the interrelations between capacities for perception, judgment, and synthesis – whether or not those capacities are operative.

conative or motivational contents (perhaps being allured or repulsed by the pig – or at least potentially understanding it as something that bears on the subject’s projects and interests). Where holism says that a system can’t possess *just one* mental state, *normativity* says that a system can’t possess *just any* combination of mental states – there are normative constraints on the relations between the mental states that we can intelligibly attribute to a single system. As suggested above (3.2) it appears unintelligible to simultaneously attribute conscious perceptual states with the contents ‘I see a pig!’ and ‘I see no pigs’ to a single subject.¹²

4.2 Shared Circuits

An underappreciated feature of Hurley’s enactivism is the way in which it tries to explain how the holism and normativity that are characteristic of mental states can emerge from the looping causal dynamics binding input to output that we considered in section 2. Her *shared circuits model* (henceforth SCM) (2008), according to which perception, action, practical deliberation and social cognition simultaneously depend on a layered series of sensorimotor circuits of increasing complexity, is intended to do exactly this. SCM distinguishes 5 ‘layers’ of adaptive sensorimotor control, of increasing complexity. Abstracting away from the dazzling array of empirical detail Hurley (2008; see also the commentaries and Clark and Kiverstein’s (2008) reply on Hurley’s behalf) uses to contextualize and support her proposal, the basic structure of SCM is as follows. At *layer 1* we have a sensorimotor circuit that enables *simple adaptive control* in response to environmental feedback; our system has a goal state, generates an output, and modulates this output in light of environmental feedback until the goal state is reached. A thermostat control circuit that heats a room until the goal temperature is reached is an example of such a system. Whilst such a control circuit can successfully move a system into a goal state, control is slow since the system must wait for feedback to arrive from the environment. So *layer 2* adds an *internal feedback loop* to the sensorimotor circuit of layer 1: over time associations will be established between the system’s outputs and its subsequent inputs. In light of these associations copies of the motor outputs of the system can be used to predict or evoke associated inputs, so the system doesn’t have to wait for feedback to work its way through the environment before adjusting its output. At *layer 3* we suppose that the associations between motor outputs and

¹² Depending on how this Davidsonian conception of the mental is argued for, this might constitute an additional transcendental component of Hurley’s View – understanding a system in a way constrained by considerations of holism and normativity might be a *transcendental condition* of understanding it as possessing mental states. That is to say, it might be argued that the possibility of a system’s possessing mental states without being subject to these constraints is unintelligible. This would be to agree with those (e.g. Davidson 1980, McDowell 1998) who argue for the ‘constitutive ideal of rationality’ with respect to mental states. In CA and her later work Hurley, as far as I can tell, simply assumes the Davidsonian framework just sketched as an influential and plausible view. Understanding her attitudes towards it more fully would require considering the extended arguments of Hurley (1989), which I won’t attempt to do here.

resulting inputs we've just appealed to can be activated *bilaterally*; so as well as output signals evoking expected inputs, input signals can evoke associated motor responses. In the right kind of system, such a control structure could enable the copying of observed actions – sensory input could trigger the motor response that is associated with it. At *layer 4* we add the capacity for our control system to *inhibit* its motor output, such that inputs needn't evoke associated motor responses, and the capacity to *monitor* the fact that output is being inhibited. Finally, at *layer 5* we add the capacity for *monitored counterfactual simulation of inputs* – the corollary to layer 4's capacity to simulate counterfactual outputs and their associated input consequences. A system with a specific goal state might, for example, cycle through various counterfactual inputs until it finds one that evokes the goal state, then generate outputs appropriate to bringing this input state about.

Hurley (2008) provides a rich empirical backdrop to this proposal, suggesting possible neural implementations and ways in which the model might be supported by research from a wide variety of disciplines. She also makes many interesting suggestions about how the control structures described at SCM's various layers might enable specific cognitive capacities, such as imitative learning, action understanding and counterfactual deliberation. We will pass over these fertile details here. To understand the way in which the kind of sensorimotor organization described in SCM features in Hurley's View we need to understand how it relates to her work on animal rationality and proto-conceptual abilities (2003a, 2003b, 2006). Again, space precludes more than a bare-bones summary of her ideas here, but that will suffice for our purposes.

4.3 From Input/Output to Flexible Generality

The key idea animating Hurley's work on animal rationality is that there is a continuum between inflexible stimulus/response sensorimotor capacities, whereby a system's behavior is rigidly determined by the inputs from its environment, and the full and flexible decouplability of means and ends that is characteristic of human practical rationality. For us rational humans the same perceptible situation can make it reasonable to act in a variety of ways, depending on our background projects and desires. Similarly, the same activity can be used to bring about a variety of perceptible consequences, depending on the context in which it is performed. These relationships between perceptual and agential states involve the holism and normativity that, as we saw above, Hurley takes to be an essential requirement of crediting a system with mental states at all. So, Hurley claims that:

“the holism and normativity of intentional agency bring with them a kind of coarse recombinant structure, but this falls well short of enabling the context-free inferential promiscuity of conceptual

abilities. An animal's various goals could nevertheless give him reasons to act in one way rather than another in particular circumstances – his own reasons, reasons from his own perspective.”¹³ (2003a, p.253)

One of the examples Hurley (Ibid. p.245) gives to illustrate the middle ground between inflexible behavioural response and fully-fledged human rationality concerns Sarah Boysen's chimp Sheba (Boysen et al 1999). Sheba can reliably perceive which of two dishes contains more jelly-beans, and indicate this dish so as to receive the sweets – her perceptual capacity informs her activity in a way that leads to her achieving her goal. But when the convention changes so that indicating the dish with more sweets results in its going to another chimp, Sheba can't adjust her behaviour appropriately, and continues to point to the dish with more sweets. However, when the dishes are replaced by numerals with which Sheba had been trained, she immediately began to indicate the *lower* numeral, and thus to receive the greater number of sweets. It thus appears that when Sheba is confronted with the dishes of jelly-beans her perception of a comparatively greater quantity of sweets is inflexibly tied to her pointing behavior; but if we replace the dishes with numerals Sheba's perception of greater quantity can flexibly decouple from or recombine with her pointing, based on the context of the experimental condition she finds herself in. Hurley thus suggests that “The symbolic context appears to have provided a scaffolding that made instrumental reasons available to Sheba, but these reasons were bound to the context the symbols provided” (Ibid.). The way in which Sheba's perception informs her action (and her action aims towards perceptible consequences) thus looks more or less flexible depending on the context she is in.¹⁴ Thus, Hurley thinks that non-human animals can and do occupy ‘islands of practical rationality’ (2003a, p.231) – contexts where the states which they are in are normatively and holistically related to a degree that is sufficient for them to intelligibly count as perceptions and intentions. Human rationality is distinctive in that these islands are (by and large) joined up – the human ‘space of reasons’ is more like a continuous landmass than a disjointed archipelago.

¹³ The end of this quote, I think, is an indication that Hurley understands her work on animal cognition as shedding light on the *practical* unity that is characteristic of an agent's perspective on the world. Whereas in the case of perception we can ask why and how the various representations that make up my experience of the world are united in a single conscious perspective, in the case of action we can ask why the various movements I am making constitute the unified activity of a single agent. We are in the process of seeing why, for Hurley, these questions concern two sides of the same coin, and how she thinks they are answered simultaneously by her view.

¹⁴ As Hurley acknowledges, there are important questions about whether this is exactly the right interpretation of this particular experiment. Regardless, this interpretation illustrates the aspect of Hurley's View in which we're interested here. Hurley also provides many more examples of the isolated ‘islands of practical rationality’ that this case is supposed to illustrate (2003a, 2006).

If we accept that the distinction between stimulus/response sensorimotor behavior and the flexible, holistic and normatively constrained pattern of relationships between beliefs and desires is a difference in degree, not in kind, it becomes intelligible how the control structures described by SCM could enable the existence of rationally constrained personal level states like beliefs and desires. Importantly, SCM ‘does not describe one all-inclusive structure, but has multiple instances for specific movements and results, at various points along different means/ends chains’ (Hurley 2008, p.14). That is, the different motor skills of a single agent might have sensorimotor control systems of different levels of sophistication with respect to the layered organization of SCM, and different possibilities for links with other control systems. The fact that the control circuit for one of an agent’s actions has the level of complexity we find at layer five does not entail that the control circuits for all her actions will. And the fact that one of her control circuits is linked to many others does not entail anything about the way those other circuits might be linked to each other. For example, Hurley suggests that:

“No doubt a monkey can move her hand to grasp a piece of sushi and move it to her mouth to eat it. But I can move my hand to operate chopsticks to pick up sushi to dip it in soy sauce and then move it to my mouth to eat it, in order to impress my boss; given associated simulative mirroring functions, I may start to resent you for eating the last piece of sushi as soon as you reach for your chopsticks.” (Ibid, p.15)

The idea here is that an agent might have separate but interrelated sensorimotor control systems for object-grasping, grasped-object-eating, chopstick-wielding, sushi-grabbing, boss-impressing, and so forth. In a suitably sophisticated cognitive agent, SCM suggests how such control systems could be linked and articulated so that the input of visually-presented chopsticks evokes a motor plan for sushi-grabbing, and the evoked sushi-grabbing is registered as something that could be deployed as a means to the social end of boss-impressing. Seeing someone else reach for their chopsticks might thus evoke in me a suppressed motor output associated with sushi-grabbing (layers 3 and 4), that might in turn evoke an associated counterfactual sensory input (layer 5) associated with an impressed boss. Hurley is contrasting these flexible relations between the ends of some control circuits and the means of others, and the sophistication of the sorts of control circuits we might have (e.g. for complex social functions such as boss-impressing) with the possible inflexibility and lack of sophistication we might find in the control apparatus of a monkey, and the corresponding simplicity of their intentional behaviour.

So, at one end of the scale we have rigid, reflex-like sensorimotor responses to an environment; at the other we have a rich and flexible set of interrelations between sensory and motor capacities. Hurley's suggestion is that we move up this scale via adding layers of complexity to a system's control circuits (moving from layer 1 to layer 5 of SCM) and by increasing the level of interconnectivity between circuits controlling different sensorimotor behaviours, such that a system's capacities for flexible adaptive response to its environment look less like isolated islands of practical rationality and more like the integrated, holistic, and normatively constrained package of cognitive capacities we associate with human reason. As we saw in 4.1, the relations between the components of this package are constrained by holism and normativity in a way that marks the presence, on Hurley's Davidsonian view, of true *perception* and *action* rather than mere states of sensory input and motor output. We now have everything we need to return to Hurley's account of perspectival unity and to understand the relationship between the different components of Hurley's View.

4.4 Shared Circuits Embodied and Embedded

Before doing so we should note – largely, for our purposes, as an aside – that Hurley (1998a, 1998b, 2008, 2010) makes important suggestions about the importance of the cultural context in which the sculpting and training of our sensorimotor capacities takes place. Consider Haugeland's (1998, p.147), description of a community of 'conformist' creatures; creatures endowed with capacities for perceptual sensitivity to the behaviours of others, and tendencies to adapt and coordinate their own behavior based on that sensitivity.

'The net effect of conformism is a systematic peer pressure within the community, which can be conceived as a kind of mutual attraction among the behavioral dispositions of the different community members. ... The result is analogous to that of gregariousness in range animals: given only their tendency to aggregate, they will tend also to form and maintain distinct herds. ... When behavioral dispositions aggregate under the force of conformism, it isn't herds that coalesce, but *norms*.' (Ibid, p.148)

SCM specifies a system of sensorimotor control that could produce conformist creatures and the associated behavioural norms. But Hurley is sensitive to the possibility that the cultural environment scaffolding a system's sensorimotor interactions can do crucial explanatory work. In a passage at the outset of CA that anticipates the direction of much future work on extended cognition (see also Hurley 1998b), Hurley writes that:

‘In trying to understand the mind’s place in the world, we [tend to] study the function from input to output, especially the way central nervous systems process and transform inputs to human organisms. We argue about whether central cognitive processes must have a language-like structure that explains the conceptual structure of thought. But we tend to ignore the function from output back to input, and the way environments, including linguistic environments, transform and reflect outputs from the human organism. The two functions are not only of comparable complexity, but are causally continuous. To understand the mind’s place in the world, we should study these complex dynamic processes as a system, not just the truncated internal portion of them.’ (CA, p.2)

This encourages us to consider the possibility that the patterns of interaction that shape and tune, both on evolutionary and developmental timescales, the control circuits of rational human agents might crucially include linguistic sensorimotor practices, and practices of giving and asking for reasons for our behavior. Hurley’s View thus encourages us to consider that human reason might be explained not simply by appealing to the internal structures described by SCM, but by attending to the way those structures knit us and our nervous systems into a particular cultural environment and associated form of life. Human rationality might thus, suggests Hurley, ‘be conceived as an emergent property of such a complex [culturally embedded sensorimotor] system, distributed across organisms and their structured environments’ (p.412)

5. *Unity*

We can now bring the strands of our discussion together. Our goal in this paper has been to understand the structure of Hurley’s View and some of its motivations. We saw (3.1, 3.3) that a key claim of the first part of CA is that the perspectival unity of conscious experience essentially (or transcendently) depends on agency. Specifically, Hurley provides a Kantian argument aimed at showing that for a representation to be part of my unified perspective on the world, I must have *intentional access* to its content –its content must be able to figure in the intentions I form. Let’s remind ourselves of a number of questions raised by this claim. First, we might wonder how it squares with passages like that quoted in §2: ‘contentful intentions and experience both depend on relations between causal input and causal output, so that agency and experience are constitutively interdependent’ (p.85).¹⁵ On its face, this looks like an inference from dynamic interdependence at the

¹⁵ Or ‘perception and action can be constitutively as well as instrumentally interdependent, because the contents of both perceptual experiences and intentions can be functions of relations within a single complex dynamic system.’ (445)

subpersonal level to constitutive interdependence at the personal level. But Hurley is clear that projecting properties from one level to another in this way must be independently motivated. So what is her motivation? Second, we saw her accuse the Kantian appeal to synthesis in an account of unity of committing the *myth of the Giving* – appealing to agency to explain a property of conscious perception, without acknowledging that parallel issues arise in the explanation of agency. But hasn't Hurley done exactly this in appealing to intentional access as the basis of perspectival unity? Third, we also saw briefly (3.2) that Hurley takes a lesson of her consideration of Kant's views to be that an account of unity needs an *objective* component – it must appeal to considerations such as subpersonal unity, and the normative coherence of the contents of consciousness. How is the account of intentional access supposed to involve such components?

The considerations we worked through in §4 allow us to answer each of these questions. Let's take them in reverse order. The objective components of her account are the dynamic sensorimotor unity described by SCM (4.2) and the holistic and normative relations that characterize the web of sensory and motor capacities that SCM enables (4.3). We saw (4.1) that Hurley endorses the Davidsonian thought that the application of constraints of holism and normativity is what marks the difference between explanations in terms of merely mechanical states (such as sensory and motor processes) and personal level states (such as perceptions and intentions). So in explaining how a suite of flexibly interrelated sensory and motor capacities can arise from a suitable sensorimotor control structure (perhaps one that is appropriately embedded in and trained by a particular cultural context (4.4)), Hurley explains the co-emergence of perceptions and actions from the activity of a dynamic sensorimotor singularity. Hence Hurley's View is not guilty of the myth of the Giving – it shows how the existence of contentful perceptions and intentions can be explained together, rather than one of these being asymmetrically explained by the other. In accounting for the co-emergence of perceptions and intentions, Hurley makes it intelligible how we can have intentional access to the contents of our perceptual states – the role of SCM is to provide an enabling explanation of how we might come to have states that qualify as perceptions and intentions whose contents hang together in this way. And, as §3 argued, intentional access is constitutive of perspectival unity. This is the sense in which, according to Hurley's View, dynamic interdependence of sensory and motor processes explains the constitutive interdependence of perception and agency at the personal level. Thus the explanatory force of Hurley's appeal to a dynamic sensorimotor unity in an account of perspectival unity is not based on a simple projection from properties of subpersonal vehicles to properties of the personal level phenomenon to be explained. It is based on the role the dynamic sensorimotor unity plays in enabling a set of capacities with the kind of interrelations that are the hallmark of the personal

level, and the Kantian argument that perspectival unity constitutively depends on one aspect of those interrelations – the possibility of intentional access to the contents of perceptual states.

Why care about Hurley's View? The most important reason, I think, is that some appropriately developed version of it is probably true. But I haven't aimed to show that here – only to show the overall shape of the view, and say where the most important arguments for its components can be found in Hurley's work. Nonetheless, anyone interested in enactive or sensorimotor approaches to perception and the mind owes these arguments their attention. Recurring challenges to such approaches question whether the links between perception and action are constitutive rather than merely causal, whether we must appeal to those links in explaining *some* properties of perception or all of them, whether such approaches can make a distinctive contribution to our understanding of consciousness, and whether links between perception and agency can shed light on cognitively sophisticated capacities for deliberation, imagination and concept use. Hurley's View presents a cohesive framework for understanding the interdependence of perception and agency, the role of this interdependence in accounting for the perspectival unity of consciousness, and the way such interdependence emerges from a set of sensorimotor processes that can enable practical deliberation. In doing so it suggests responses to each of these challenges, in a way that is informed by a dazzling combination of empirical rigour and sophisticated philosophical reflection. If Hurley is right, our capacities for perception, agency and thought are essentially interdependent and emerge together from a tangle of sensorimotor processes that are both cause and effect of the web of interactive and communicative practices they weave us into. Hurley's legacy to embodied and enactive philosophy of mind and cognitive science was this unified vision, and an impressive array of philosophical and empirical tools to motivate and investigate it. I hope this paper inspires some readers to take up the task.¹⁶

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